AN ACTION PLAN FOR
SAN JOAQUIN FALL-RUN CHINOOK SALMON POPULATIONS

A. Introduction

The San Joaquin River Management Program was established through legislation (Chapter 1068/90) to identify actions which can be taken regarding the San Joaquin River to benefit all legitimate uses of the system. The program objective is to develop comprehensive and compatible solutions to water supply, water quality, flood control, fisheries, wildlife habitat and recreation needs.

The San Joaquin River Management Program (SJRMP) Advisory Council has determined there is an immediate need for better protection of San Joaquin fall-run Chinook salmon. The last spring-run of chinook salmon in this drainage was eliminated in the late 1940's with the closure of Friant Dam. The Department of Fish and Game and the U.S. Fish and Wildlife Service have indicated that salmon populations in the Merced, Tuolumne and Stanislaus rivers are now at dangerously low levels. In the absence of immediate effective actions to improve the next few year classes they believe this stock of salmon will become likely candidates for protection under the Federal and State Endangered Species Acts. Such action would focus management decisions on protecting the fish population and habitats, with less regard for compatibility with other uses of the system.

The Department of Fish and Game has begun implementing restoration measures consistent with their "Central Valley Salmon and Steelhead Restoration and Enhancement Plan (April, 1990)." Much of their and the Department of Water Resources' effort thus far has focused on physical modification of the spawning and nursery habitats. The State Water Resources Control Board recently reconvened the Bay-Delta Hearing to develop interim standards by the end of 1992 that "help restore the environment and improve the water supply." The water supply and water quality measures in Draft Decision 1630 may improve habitat conditions for San Joaquin salmon in the tributaries and the San Joaquin Delta. Comments on this draft are due in January and a final Decision is expected in 1993. The recent Federal legislation, the Central Valley Project Improvement Act (PL-102-575), enacted on October 30, 1992, provides for opportunities to enhance the fish and wildlife resources in the San Joaquin drainage and should also be considered in relation to this Action Plan.

In recognition of the importance of immediately restoring healthy salmon production levels in concert with the other beneficial uses in the San Joaquin drainage the SJRMP Advisory Council has developed this Plan. We urge everyone involved in fishery and water-related management and planning activities that influence the San Joaquin River Basin to use this Action Plan, in combination with the plans of the responsible agencies, as a guide. We should all consider proactive implementation of the proposed action items during the next five years.

B. Purpose

The Plan identifies some key problems and provides a consensus opinion on actions recommended to measurably improve San Joaquin fall-run chinook salmon production from the low levels anticipated over the next five years. The majority of fall-run salmon return to their natal freshwater streams to spawn as two, three or four year old fish. The fate of each successive generation strongly determines how many adult fish return to produce subsequent generations. Therefore we are recommending actions to improve the fate of the one, two, three, and four year old salmon now in the ocean that will soon return to spawn, as well as the fate of their offspring over the next few years. These actions could be effective in meeting the purpose of this Plan and may help meet the legislative mandate given Fish and Game to significantly increase salmon populations by the year 2000 (ref. Fish and Game Code Section 6902 (a)). These actions should be implemented beginning in the fall of 1992 and extend through the fall of 1997. Some of the proposed actions are "studies" or planning evaluations which can provide important information leading to solutions in the future. Consistent with the charge of the San Joaquin River Management Program we recommend these actions with an eye toward protecting the other beneficial uses of the river system.

C. Life History

Chinook (or King) salmon are anadromous fish meaning they must migrate from the ocean to reproduce (spawn) in fresh water. They "home in" to their natal streams while migrating upstream and die after spawning a single time. Fall-run salmon generally start their migration from the ocean and begin arriving in the San Joaquin tributaries in early fall as water temperatures begin to cool. Most spawning occurs in the 20 river miles below the first major dams and reservoirs on the Merced, Tuolumne and Stanislaus rivers during October, November and December (Figure 1).

Females select suitable spawning sites with acceptable water depths and velocities, and gravel compositions. Nests, or redds, are excavated and the eggs are fertilized while being deposited

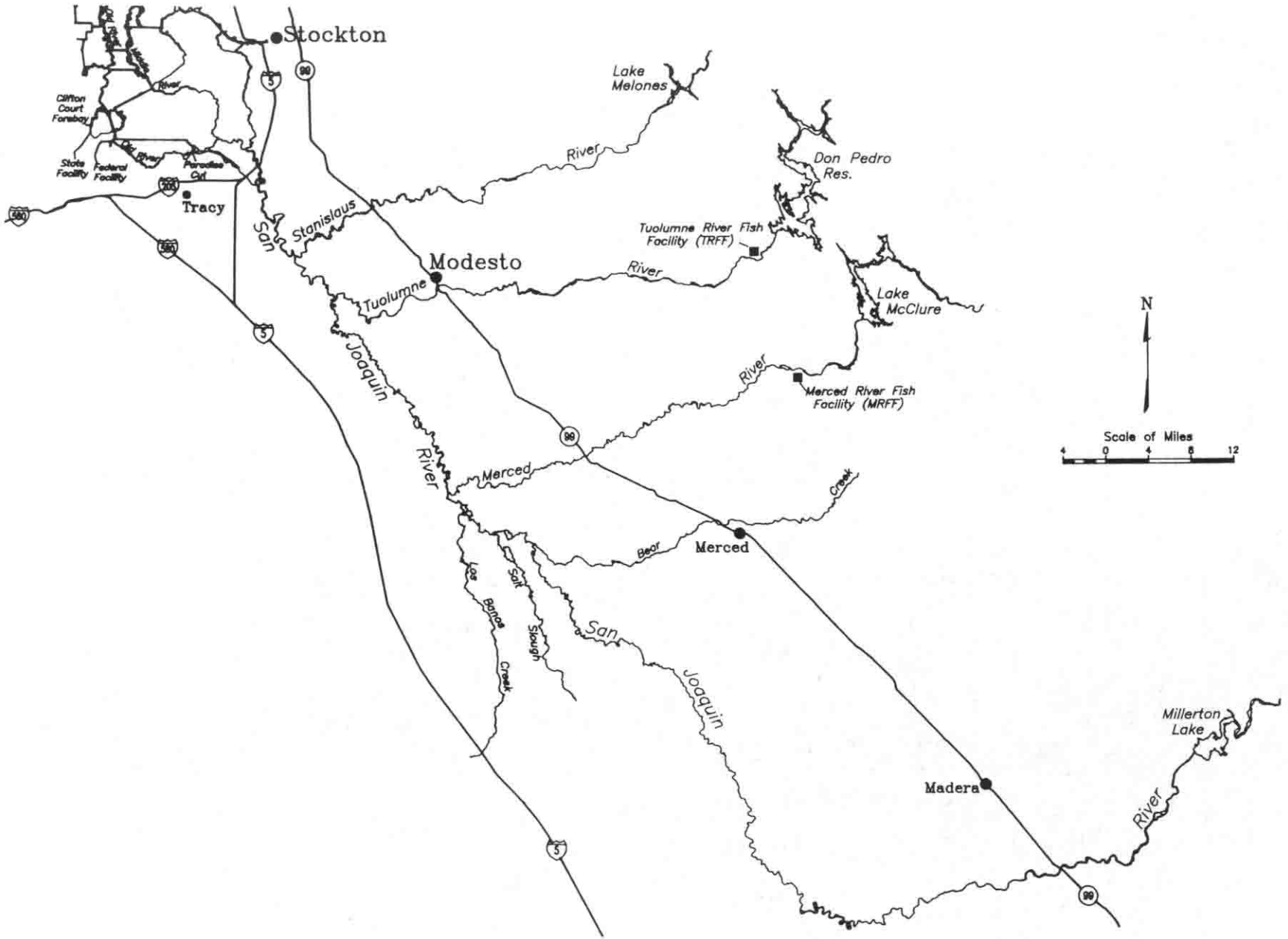

Figure 1. Map of San Joaquin River, Tributaries and South Delta

in the nest. The reproduction process generally proceeds upstream such that each successive egg pocket within a redd is covered by gravel from subsequent excavations. Generally each redd contains 2,000 to 8,000 eggs, depending on the size of the female. The adults die a few days after spawning.

Salmon eggs incubate in the gravel for approximately a month while cell division occurs. The fishery agencies recommends that incubation temperatures should be between 42 and 56°F during this time period to optimize egg survival. The sac fry or alevins then hatch and remain in the gravel, nourished by the large sack of "oil" originating from the egg. After another month the alevins have absorbed most of the oil and move up through the gravel to begin their lives as free swimming juvenile salmon in their natal rivers. They feed on plankton and insects for two to four months until reaching three to four inches in length. From mid-March through early June many juveniles undergo physiological changes, referred to as smolting, which allow them to migrate from fresh water and survive and grow to adult size in the ocean. This period of transition from fresh to salt water is very stressful for young salmon. It is believed that the homing ability which guides adult salmon back to their natal streams to spawn after two to five years in the ocean is developed as smolts migrate to the ocean. Some juveniles remain in fresh water through their first summer of life and migrate to the ocean in the fall as yearlings.

These fish become 8 to 12 pound adults within three years in the ocean. Their size and the number surviving depend on both inland (fresh water) and ocean habitat and food conditions. A substantial portion of the mortality of San Joaquin populations occurs while the young reside in fresh water. Many adults are harvested in the sport anglers and commercial salmon fishermen. As previously mentioned, most fall-run salmon in California return to spawn (or "escape" harvest and natural mortality) in their third year of life but some five year old fish return weighing up to 40 pounds. The annual population estimates (known as escapement surveys) made by the Department of Fish and Game and others document the number of returning adult fish. These are fish that have survived the fresh water environment as young, escaped the sport and commercial harvest, avoided various sources of natural or other mortality, and are returning to spawn. Generally 40 to 65 percent of the returning fish are females.

The basic habitat requirements of Chinook salmon must be met if healthy populations are to be maintained.

D. Population Status

The annual population surveys since 1953 indicate wide fluctuations in the number of salmon returning to spawn in San Joaquin River tributaries (Figure 2). The effects of drought,